



TRANSPORTATION ADVISORY COMMITTEE

Arlington Planning Department, 730 Mass Ave,
Arlington MA, c/o Laura Wiener

To: Board of Selectmen, Arlington, MA

From: Transportation Advisory Committee (TAC)

Subject: Crosswalk on Highland Avenue at High Haith Road

Date: November 18, 2015

Summary of Recommendations

Based on the study described below, the following is a summary of recommended improvements for the crosswalk location on Highland Avenue at High Haith Road:

- Add advance yield lines on both approaches to the Highland Avenue to improve crosswalk visibility for drivers.
- Add a new in-street “yield to pedestrian” sign in the center of the crosswalk to improve the visibility of the crosswalk to drivers in both directions.
- Consider replacing pedestrian warning signage at the crosswalk with brighter fluorescent yellow green signs.
- Depending on availability and cost, electronic speed radar signs could be installed on the side of the roadway either as an alternative to or in addition to the in-street sign recommended above. The electronic signs could be considered to provide temporary signage during the winter months when the in-street sign would be removed.

Relocation of the crosswalk to Ottawa Street was considered but is not recommended because of insufficient sight distance on the southbound approach at that location, and the absence of a direct connection to a cross street to the west of Highland Avenue. The relocated crosswalk would be less convenient for pedestrians walking to the Ottoson Middle and Arlington High Schools.

Purpose of Study

A working group of the TAC has assessed the safety of the pedestrian crossing across Highland Avenue at High Haith Road in response to concerns raised by neighborhood residents. Deb Savage, a resident of the neighborhood in the area of the Highland Avenue/High Haith Road intersection, communicated these concerns to the TAC in the fall of 2014. This communication followed upon the implementation of the TAC’s crosswalk flag program at the intersection to

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increase the visibility of pedestrians as they cross Highland Avenue. Previous pedestrian safety measures implemented by the Town were the installation of crosswalks on the north, east, and west sides of the intersection, and the installation of pedestrian warning and advance warning signs in both directions on each side of Highland Avenue, alerting motorists to the pedestrian crossing. All of the above measures currently are in place.



Figure 1 High Haith Road/Highland Avenue Intersection

on the safety of children walking to and from the Brackett Elementary School on Eastern Avenue, the Ottoson Middle School on Acton Street, and the High School on Massachusetts Avenue. Neighborhood suggestions for improvements included speed bumps, police presence, an in-street sign at the crosswalk, and signage for restricted parking at the corners of Highland Avenue.

Approach

A member of the TAC working group met with Ms. Savage on January 26, 2015 to discuss conditions at the intersection and to obtain further details related to the issues raised by neighborhood residents and suggestions to further increase pedestrian safety, particularly for children on their way to and from school.

The working group's approach to the study emphasized the following:

- Observation of conditions at the Highland Avenue/High Haith Road intersection to gain a better understanding of the factors that might be contributing to continuing pedestrian safety concerns;
- Assessment of the practicality and likely effectiveness of potential measures such as additional signage to further increase the visibility of the pedestrian crossing and/or to reduce the incidence of motorists driving through the crosswalk when pedestrians are present.

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In addition, the TAC reviewed traffic counts and speed measurements taken by the Arlington Police Department at two locations on Highland Avenue on either side of the crosswalk on May 11-14, 2015 to assess the degree to which motorists actually exceed the speed limit on Highland Avenue. The question of drivers' violating the speed limit was of concern primarily in relation to whether this behavior causes drivers to be less likely to see the pedestrian signage, the crosswalk, or the pedestrians in the crosswalk.

Potential Limitations on Crossing Visibility

The working group considered the following conditions that may limit drivers' ability to notice and yield to pedestrians in the crosswalk across Highland Avenue at High Haith Road:

- Speed of vehicles (as noted above);
- Grade of Highland Avenue approaches ;
- Characteristics and condition of crossing pavement markings;
- Visibility of signage alerting drivers to the crosswalk.

Speed: The speed limit on Highland Avenue is 25 mph. The average speed observed in both directions on Highland Avenue was 27 mph and the 85th percentile speed¹ was 31-32 mph, based on the measurements taken by the Arlington Police Department. The measurements similarly show that two-thirds of vehicles exceeded the 25 mph speed limit.

Most school children use the crosswalk during the hours between 7:00 and 8:00 AM and 2:00 and 3:00 PM, when the average speeds are 27-29 mph in the morning and 25-26 mph in the afternoon. Results of the speed measurements and corresponding traffic volume counts are shown Table 1. Pedestrians frequently perceive vehicle speed to be excessive even at the legal limit of 25 mph and the tendency of vehicles to exceed the speed limit, even by only a few mph, may be a legitimate safety concern, meriting ameliorative measures.

In addition, the working group observed crossings at the intersection when children walked to school in the morning on June 16, 2015. Both traffic and pedestrian volumes appeared to be light and there were no significant pedestrian/vehicle conflicts during this time period. The number of pedestrians crossing Highland Avenue, most of whom were school children, was as follows:

- 7:00 – 7:45 AM: 15
- 7:45 – 8:25 AM: 25

It is possible that school attendance and the number of children crossing Highland Avenue were a little lower than usual because the observations were conducted the week before schools closed for the summer.

¹ The speed that is equal or higher than that traveled by 85 percent of vehicles, i.e. 15 percent travel at higher speeds.

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Table 1
Summary of Speed Measurements and Traffic Counts for Highland Avenue/High Haith Intersection
May 2015

	Average Speed		Traffic Volume		85% Speed
	Northbound	Southbound	Northbound	Southbound	
AM	27	29	159-178	186-197	-
PM	25	26	157-166	97-116	-
Combined AM and PM	26	27	-	-	-
Daily	27	27	2,629-2,733	1,229-1,677	31 -32 ²

Source: APD

Roadway Grade: The intersection is located about 300 feet to the north of the crest along a down slope that extends all the way to Mass. Ave. The grade does not have a substantial adverse effect on the visibility of the crosswalk in the southbound direction, nor pedestrians' ability to see approaching vehicles. In the northbound direction, however, the visibility of the crosswalk is constrained beyond the crest of the hill, although drivers have about 7.6 seconds at average speeds of 27 mph with a clear view of the intersection, after reaching the top of the hill. The AASHTO standard for stopping distance for vehicles traveling at the 85th percentile speed of 31-32 mph is about 205 feet, which is less than the northbound stopping distance past the crest of the hill. Measurements taken by the TAC demonstrate, however, that a child in the crosswalk is not clearly visible for more than 175 feet on the northbound approach (not accounting for pedestrian flag use). Thus, the approach falls somewhat short of the AASHTO standard of (slightly over) 205 feet, suggesting that measures to improve sight distance would be beneficial. Another constraint is that pedestrians entering the crosswalk have limited visibility of northbound oncoming vehicles beyond the crest of the slope, to their south.

Condition of Pavement Markings: Existing crosswalk pavement markings are clear and visible, although the markings are faded in the center of the Highland Avenue crossing. Northbound drivers, however, cannot see the existing crosswalk, which is on the north side of the intersection, until they are at the entrance to the intersection.

Signage Visibility: There is a pedestrian warning sign in advance of the crosswalk alerting drivers to the upcoming crosswalk and a pedestrian warning sign at the crosswalk on both sides of the street. Visibility of these signs is somewhat obscured by street trees at various distances from the crosswalk (see Figures 2 and 3), particularly on the southbound approach to the intersection, which is on an upward slope. The pedestrian flags in use at the intersection help to improve the visibility of school children and others in the crosswalk.

² Speed measurements and traffic counts are for two locations: 112 and 186 Highland Avenue.

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Figure 2 Southbound Approach to Intersection

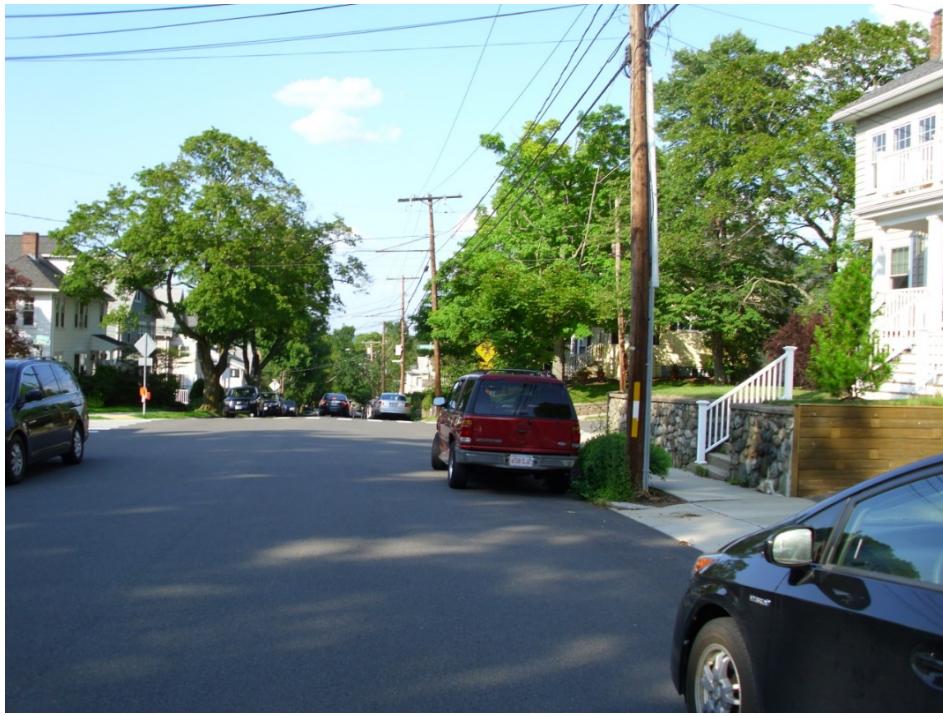


Figure 3 Northbound Intersection Approach

Potential Solutions

Several potential solutions have been suggested that may increase the safety of the pedestrian crossing:

- Additional signage;

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- Relocation of the crosswalk to Ottawa Street, about 500 feet to the south of High Haith Road on Highland Avenue;
- Painting intersection pavement markings across Highland Avenue on the south side of the intersection, such that there would be painted crosswalks or other pavement markings on all four sides of the intersection.
- Curb extension, or a widening of the sidewalk into the roadway.

Signage solutions include:

- Augmenting existing signage with an in-street “Yield to Pedestrian within Crosswalk” sign in the center of the crosswalk;
- Relocating the pedestrian warning sign (shown in the photo) at the western end of the crosswalk on the southbound approach to the intersection to avoid tree blockage;
- Providing brighter, more attention-getting signs;
- Removal or trimming of the trees that currently limit the visibility of existing signs;
- Adding electronic signs in both directions that show vehicle speeds.

Consideration of an alternate crosswalk location at Ottawa Road: Relocation of the crosswalk to Ottawa Street, south of High Haith Road, is likely to increase the visibility of the crosswalk to some degree because the roadway grade of Highland Avenue is less steep at this location.

Moreover, pedestrians would be better able to see cars approaching in the northbound direction. Sight distance in the southbound direction, however, would be reduced, because the distance from the crest of the hill to the intersection (on a downward slope) would be lower than the sight distance on the upward slope of the hill on the southbound approach to the High Haith Road intersection. Another drawback to the Ottawa Street crossing location is that Ottawa does not extend beyond Highland Avenue to the west in the direction of the schools, so pedestrians would need to walk northbound to High Haith Road or southbound to another cross street. There is no sidewalk on Longfellow Road, the next westbound cross street to the south of Ottawa Road, so this street is not suitable as part of a walking route to school.

School children walking to and from the Ottoson School and the High School would be likely to cross Highland Avenue at the signalized intersection on Gray Street, instead of at the Ottawa Street intersection, which would be the crossing of choice for elementary school children walking to the Brackett School. It also is likely that some children and other pedestrians would continue to cross Highland Avenue at the High Haith intersection, even after the crosswalk is moved to Ottawa Street.

Consideration of Curb Extension: Another potential option, curb extension, could slow traffic by narrowing the roadway on Highland Avenue at the High Haith intersection. Another advantage from the standpoint of pedestrians is that the distance required to cross the street would be reduced. Curb extensions, while possibly feasible, do not appear to be a practical solution because the level of pedestrian activity generally is low, apart from children walking to and from school during specific, short time periods before and after school.

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Recommendations

The following improvements are recommended:

- Add advance yield lines on both approaches to the Highland Avenue crosswalk as shown in Figure 4 to improve crosswalk visibility for drivers.
- Add a new in-street “yield to pedestrian” sign in the center of the crosswalk to improve the visibility of the crosswalk to drivers in both directions. The drawback to this solution is that in snow season, the sign would need to be removed to accommodate plowing. Nevertheless, having the sign in place during the other seasons would increase awareness of the crosswalk, possibly with some degree of increased awareness continuing during periods when the sign is removed. A consideration is that in-street signs generally are located on streets with a yellow centerline.



Figure 4 Advanced Yield Pavement Marking

- Consider replacing signage at the crosswalk with brighter fluorescent yellow green signs.
- Depending on availability and cost, electronic speed radar signs could be installed on the side of the roadway either as an alternative to or in addition to the in-street sign recommended above. The electronic signs could be considered to provide temporary signage during the winter months when the in-street sign would be removed.

Relocation of the crosswalk to Ottawa Street is not recommended because of insufficient sight distance on the southbound approach at that location, and the absence of a direct connection to a cross street to the west of Highland Avenue. The relocated crosswalk would be less convenient for pedestrians walking to the Ottoson Middle and Arlington High Schools.

Respectfully submitted,

Howard Muise – TAC Chair

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